Document Reviewed: Draft Final Baseline Human Health Risk Assessment
Reviewer: Mike Poulsen, DEQ
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Clean version page numbers

Page	Section	Paragraph, Sentence	Comment	Rationale
xxvii	Acronyms	Footnote 1	Typo: “as” should be “has”.	
2	ES.1	Para 1	Surface sediment is defined as 0 to 30.5 cm. I suggest we use 30 cm. Also on page 3, top bullet; page 52, section 3.4.2.	
4	ES.2	Bullets	“Human breast milk” can be shortened to “human milk”.	
5	ES.3	Para 1, last sentence	“Therefore, the EPCs are referred to as the 95% UCL/max and mean throughout the BHHRA.” EPCs should be referred to as RME or CTE throughout the document.	
8	ES.5	Table ES-1	Specify which exposed receptor is used to develop the risks shown for the breastfeeding infant pathway.	
10	ES.5	Second bullet	The exposure durations are 30 years and 70 years. It is not necessary and somewhat misleading to also state that exposure occurs every month. In fact, the ingestion rate may reflect consumption of fish only during parts of the year.	
10	ES.5	Second to last para, last sentence	Risks from regional consumption of fish are stated to be unacceptable, but that site risks are greater. This statement should include a quantitative assessment that site risks are orders of magnitude greater than regional risks.	
11	ES.5	Para 1	I am not sure what “Human Health Risk Management Recommendations” refers to. Is this the separate risk management report, or a section in this BHHRA?	
15	ES.5	Figure ES-4	To avoid questions about the gaps in the figure, it would be helpful to include a footnote explaining that HIs were not calculated for combined child/adult exposure scenarios.	
17	ES.6	Bullet	Maximum HI associated with whole body fish ingestion is 60,000 from breastfeeding (Table ES.1), not 5,000.	
17	ES.6	Para 1	Background tissue is stated as having 20 to 100 times acceptable concentrations. If this is included, there should be a related comparison statement that site risks are up to 10,000 times acceptable levels.	

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28	2.1.6	Middle of last para	The uncertainty associated with undepurated clams should be limited to the uncertainty section.	
29	2.3.1	Para 1	I do not understand why the TCE toxicity statement needs to be here. I would be better to present this in Toxicity section.	
42	3.3.1.7		I do not understand why we need this section.	
43	3.3.1.7	Last sentence	This sentence does not make sense to me. I do not see the connection between drinking water and fish consumption. If the intent is to go through the receptors and identify who else is exposed by this route, I may understand, but I still find this confusing.	
43	3.3.2.2	Last sentence	Expand this sentence to state that EPA has knowledge of divers using wetsuits in the Lower Willamette.	
44	3.3.2.6		I do not understand why we need this section.	
48	3.3.5.4		This sentence does not make sense to me. I do not see the connection between drinking water and fish consumption.	
48	3.3.6.1	Last Para	DHS SHINE is now the Oregon Health Authority (OHA), Environmental Health Assessment Program (EHAP).	
49	3.3.6.3		This sentence does not make sense to me. I do not see the connection between drinking water and fish consumption.	
50	3.4	Para 2	"Therefore, the EPCs are referred to as the 95% UCL/max and mean throughout the BHHRA." EPCs should be referred to as RME or CTE.	
59	3.5	Top para	"… exposure assessments were based on the RME expected to occur under both current and future land use conditions, as well as hypothetical future conditions." I do not understand the distinction between future conditions and hypothetical future conditions. The "hypothetical" may refer to use of surface water as drinking water. EPA agreed to the use of the term in this case.	
65	3.5.1.5.4		I believe the crayfish advisory being referred to is for the McCormick & Baxter site. The 1991 advisory was lifted in February 2010.	
66	3.5.1.6.3	Para 1	"On October 23, 2008, the Oregon Environmental Quality Commission approved a fish consumption rate of 175 g/day, referenced from the CRITFC (1994) survey, as the basis for ODEQ to revise state water quality standards. To date, the water quality standards have not yet been revised using the fish	

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			consumption rate of 175 g/day." On June 16, 2011, the EQC approved revised state water quality standards based on the new fish consumption rate. The standards will not go into effect until approved by EPA, expected fall of 2011.	
79	5.1.2		Provide the exponential form of the cancer risk equation.	
83	5.2.1.3.1	Second para	Arsenic is not a metal, although it is a metal-like inorganic chemical.	
91	5.2.2.6		HI>1 is said to be limited to RM7W. According to Table 5-45, there are also unacceptable risks at RM8.5W and RM11E.	
92	5.2.3.2		The following statement is confusing: "Risks for both adults and children were evaluated, as well as cancer risks to a combined child and adult receptor, in order to incorporate early-life exposures". Early-life exposures for children can be evaluated without combining child with adult exposure.	
101	5.2.5.4	Para 1	The summary of fish consumption risk does not include the breastfeeding pathway. Discuss the HQ of 60,000 (Section 5.2.5.2.4).	
	Old Section 6		The TZW-surface water section was moved from the HHRA to the RI report. The agencies need to review this. This has important implications for upland risk assessments.	
109	6.0	Para 5	Is the following sentence acceptable: "However, a deterministic risk assessment alone cannot quantify the degree of conservatism in risk estimates, and this BHHRA does not include a probabilistic risk assessment, per agreement with EPA." I might accept it if it says something like "However, a deterministic risk assessment cannot quantify uncertainty as well as a probabilistic risk assessment (which was not performed for this site)."	
114	6.1.7		This section appears to be redundant with similar statements added to Section 6.1.6, paragraph 2.	
115	6.1.10		The uncertainty section should discuss that TBT was not analyzed in fish tissue from the shipyard in Swan Island Lagoon. This results in an underestimation of risk, but the magnitude should not be important.	
117	6.1.13		Should we include a statement that new data may indicate areas of higher localized risk?	
118	6.1.16		DEQ does not have an RBC for "generic oil". The RBC used was for transformer mineral oil.	

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119	6.1.17		Including additional analytes in the risk assessment does not contribute to uncertainty. It will make the risk assessment more accurate, although evaluating the risk of relatively minor chemicals is unlikely to alter conclusions.	
120	6.2.3.2		The references in the section are to DHS, which is now OHA. Perhaps they should say "OHA (previously DHS)".	
123	6.2.5	Second para	EPA guidance does not say to use both the mean and 95UCL on the mean EPC for exposure. DEQ guidance and the approved workplan for this site was to include the mean. But EPA guidance is to use the 95UCL concentration for both RME and CTE exposure.	
124	6.2.5.1	Third para, last sentence	Revise the definitive statement as follows: "… this uncertainty would <u>likely</u> not change the conclusions of this BHHRA."	
126	6.2.5.3	Middle of Para 2	Typo: "was used also used".	
128	6.2.5.3	First para	"As with the fisher scenarios, it was assumed that 100% of the fish consumed was caught at the same location for 70 years" This is misleading because the "same location" for the tribal fisher is the entire study area.	
128	6.2.5.3	Last para	"Daily shellfish consumption rates used in this BHHRA represent mathematical artifacts to account for annual consumption rates." The rates are not "mathematical artifacts". It is better to state that daily shellfish consumption rates are developed from annual rates, and should not imply that shellfish are consumed daily.	
129	6.2.5.3	First para	"It is unlikely that the Study Area supports *Corbicula* populations large enough to supply the quantity of tissue needed to satisfy the ingestion rates used in the BHHRA." This statement should be qualified to state that <u>current</u> clam populations are unlikely to support ingestion rates. Restored future populations of local bivalves could be higher than current *Corbicula* populations.	
136	6.3.1	Para 2	I do not know why the BHHRA did not look at early-life risks in the separate evaluation of children (not just the combined child/adult evaluation). However, I do not think this is important enough to add.	
137	6.3.2	Para 1	Thallium is added to the section heading on chemicals without toxicity values, but this is not explicitly stated in the text. There are PPRTV appendix values for thallium.	

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140	6.3.6	Para 2	This section is poorly written and sometimes confusing, if not incorrect. For example, “The extent of this underestimation is proportional to the actual GI absorption, which would not exceed 50%.” The reference to 50% is confusing, especially if the GI absorption rate is unknown. An unknown rate means that the risk could be substantially underestimated, possibly by more than an order of magnitude. Depending on how you define “underestimation”, underestimation of risk is inversely proportional (not proportional) to absorption rate.	
146	7.1.1.1	End of para 1	Typo: brown bullhead is a catfish, not a trout. The earlier parts of the paragraph are correct.	
151	7.2.1	Para 1	I do not see how they get 26 COCs. My count is; PCB (1), dioxin (1), metals (6), DEHP (1), PAHs (3 + 1 for total), HCB (1), and pesticides (7) = 21	
154	7.2.1	Last para	In discussing regional background, there is mention of site concentrations being higher, without stating how much higher site concentrations are than background (100 to 1000 times higher).	
	Tables		I find the use of scientific notation for most presentation of HI to be unnecessarily technical, and detracts from a clear presentation of results. A standard presentation to 2 significant digits would be easier to comprehend and compare with the acceptable level of 1.	
	Table 4-1		The calculation of SFdermal from SForal is incorrect for chromium VI. SFo should be divided by the GI absorption factor, not multiplied. Explain that the new toxicity information for chromium and naphthalene supersedes the cancer classification as D.	
	Table 5-198		The split of cancer/non-cancer is fine, although split columns may work better for presenting risks.	
	Tables 5-201, 5-202		I think these tables detract from the concluding messages. They may have been requested by the agencies. I think summary Table 5-200 is sufficient.	
	Table 5-204		I still consider our earlier comments on this table to be relevant. I would prefer to see the highest risk pathway (fish consumption) at the far left, followed by the other pathways in order of risk. The identification of order-of-magnitude exceedances needs to be far more obvious. Shading of cells should work. The same approach should be used for non-cancer risks to identify the highest	

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			risks.	
	Table F6-3		I believe this should be Table 6-3. It would be better not to have scientific notation for HI.	
	Table 6-8		NA = not analyzed. Include a reason why these chemicals were not analyzed.	
	Figures		Figures 5-1, 5-3, 5-5, 5-7, 5-9, 5-11, 5-13, 5-15, 5-17, 5-18, and 5-20 are better represented using bar graphs. With this type of data, there is no reason to assume a connection between datapoints.	
	Figure 6-1		Showing the ratios of east and west in this manner is deceptive because the depiction minimizes the absolute magnitude of values less than 1. I suggest showing the ratio of the larger value to the smaller value, with east/west defined as positive, and west/east defined as negative. This will then show magnitude on the same scale, with a clear indication of whether the east or west concentration is greater.	
	Figure 7-1		Show the 1E-6 line.	
	Figure 7-2		Show a line for HI=1. The current arrow is inaccurate.	
	Figure 7-3		Show the 1E-6 line.	
	Figure 7-4		Show HI=1 line. The current arrow is inaccurate. Include the maximum HI of 60,000 for breastfeeding infant of fishers.	
	Figure F2-13		The table says this is an EPC summary, but the table is limited to high detection limits. The title of the table should clearly state this. Areas with high DLs typically have high concentrations of other chemicals. The agencies need to keep track of these areas in the FS.	
	Map 2-6		The map is for smallmouth bass and carp. There should be a similar map for crappie and bullhead.	
	Map 5-1-1		“RME and Max” should be replaced with “RME”.	
	Map 5-4-1		This is a good presentation of risk from consuming fish. The HQ=60,000 value for breastfeeding infant of fishers should be shown. Scientific notation is typically not needed, and should not be used for HQs in order to improve clarity. Noncancer values should be coded for order of magnitude exceedances similar to cancer values.	
	Map 5-9-1		Color coding would be helpful on this map.	

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Attach F3 P 6	5.1.4	Para 1	Explain that the metabolic half-life of PBDEs is assumed to be similar to the half-lives of PCBs and dioxins, so that the infant exposure adjustment factor of 38 for chemicals with half-lives of approximately 7 years can be used as the IRAF for PBDEs.	
Attach F3 P 7	6	Para 2 and 3	Statements such as “presents uncertainty” should be expanded to state that this may underestimate (not overestimate) risk.	
Attach F3	Table F3-1		Scientific notation is not necessary and detracts from a comparison with the acceptable HI of 1.	
Attach F6 p 1	1		I do not recall that EPA denied the use of a probabilistic evaluation during scoping of the BHHRA. Instead, I think EPA commented that the LWG would need to provide sufficient details in the workplan to document collection of data necessary to satisfactorily conduct a PRA.	
Attach F6 p 6	2.4	Last sentence	The sentence may imply that the risks are always being underestimated. Instead, the text should state that estimated risks could be lower by a factor of 10, or higher by a factor of 9.	
Attach F6 p 11	2.1.4		Include a discussion of the potential for high detection limits – that is, there may be high concentrations of another chemical, which may or may not be quantified (resulting in an underestimation of risk).	
Attach F6 P 11	2.1.5		For metals or other contaminants without quantified GI factors that may actually be low, risks from dermal exposure could be underestimated.	
Attach F6	2.1.6		As long as there is a discussion of differences in Aroclor and congener data, provide a quantitative discussion, rather that state that one is sometimes higher or sometimes lower than the other measure.	